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SONG K. JUNG
LONG ALDRIDGE & NORMAN,LLP
SIXTH FLOOR
701 PENNSYLVANIA AVENUE,NW
WASHINGTONS, DC 20004

EXAMINER

ZERVIGON, RUDY

ART UNIT

PAPER NUMBER

1763

31

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/039,438

Applicant(s)
W o Sup Shln, et al

Examiner
Rudy Zervigon

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— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Jan 16, 2002

2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-25 is/are pending in the application

4a) Of the above, claim(s) _____ is/are withdrawn from consideration

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-25 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirements

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

19) ☐ Notice of Informal Patent Application (PTO-152)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

20) ☐ Other:

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DETAILED ACTION***Request for Continued Examination***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 16, 2002 has been entered.

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 19, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Nelson (U. S. Pat. No. 4,147,581) in view of Chung et al (U. S. Pat. No. 5,00,795) Nelson discloses an etching process and apparatus for chemically etching material from a substrate (col. 1, lines 9-11).

An etched product is covered with an aqueous liquid (first etchant) and the resulting liquid (residual etchant) is passed through an ion exchanger to remove the ions from the rinse liquid which is reused or discharged. (Abstract). The solids (residue materials) are removed from an etcher (a first tank) (2) via a stream (1) which passes into a rinse chamber (a second tank) (4). (Fig. 1; col. 4, lines 49-68).

The rinse liquid stream (5) then goes through an ion exchanger means (11). A replenishing solution from the ion exchange means is combined with the stream of a bulk storage tank (20) to form a combined stream (connecting passage) (31) going to the etcher (2). (col. 5, lines 35-55) The bulk storage tank (20) has streams flowing to the etcher (2) for etching the product and to the ion exchange means (11) in order to regenerate the resin. Stream (12) from the ion exchanger (11) moves to a discharge stream (16), which passes to a sewer. (Col. 5, lines 5-10). The etcher (2) can be a spray etcher which would inherently have nozzles (col. 4, line 40). Etchable material reads on a glass substrate (col. 4, line 38).

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Nelson does not disclose expressly an immersion of a substrate in an etched bath or a bubble plate.

Chung et al disclose a bubble plate (17) located on the floor of a tank (10). (Fig. 1) The bubble plate (17) transmits inert gas to create a bubbling condition within the tank (10) for sufficient agitation (col. 1, lines 60-68). Substrates (14) are immersed in an etch bath (13) (Fig. 2; col. 2, lines 35-38)

At the time of the invention it would have been obvious to a person of ordinary skill in the art to replace the spray etcher of Nelson with the etch bath and bubble plate of Chung et al.

The motivation for doing so would have been to etch substrates by spraying etchant onto substrates to immerse the substrates in said etchant within a tank while agitating the etchant with inert gas transmitted through a bubble plate in order to promote reaction and remove from the substrates' surfaces reacted impurities as taught by Chung et al. (Col. 2, lines 45-52)

Therefore, it would have been obvious to combine Nelson with Chung et al to obtain the invention in claims 1, 19, 20, and 21.

3. Claims 2, 7, 10, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (U.S. Pat. No. 4,147,581) in view of Chung et al (U.S. Pat, No. 5,00,795) as applied to claims 1, 19, 20, and 21 above, and further in view of Tittle (U.S. Pat, No. 4,886,590).

Nelson and Chung et al are discussed above.

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Nelson and Chung et al do not disclose expressly a temperature sensor.

Tittle et al disclose a process control system having a plurality of sensors for sensing various parameters. One of the parameters for controlling the process may include temperature (abstract; col. 3, lines 65-68; col. 4, line 64- col. 5, line 10). A formula may be used to compute bath effectiveness based on the parameters detected. Any variation of the effectiveness triggers a responsive change. A response change can be the termination of the etch process.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to control the etching operation for the etching apparatus of Nelson with the chemical processing control system of Tittle et al.

The motivation for doing so would have been to monitor, initiate corrective action and establish limits for the etching operation as taught by Tittle et al (claim 8).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Nelson with Chung et al and Tittle et al to obtain the invention as specified in claims 2, 7 and 10.

4. Claims 3-6, 8-9, 11-18, 23, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (U. S. Pat. No. 4,147,581) in view of Chung et al (U. S. Pat. No. 5,00,795) as applied

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to claims 1, 19, 20, and 21 above, and further in view of Jones et al (U.S. Pat. No. 3,869,313) and Tittle (U.S. Pat. No. 4,886,590).

Nelson and Chung et al are discussed above.

Nelson and Chung et al do not disclose expressly a rinse and drying bath for the substrate, a temperature sensor, a concentration measuring device and a HF etching solution.

As to claims 3-5, 8- 9, 11-12 and 18, Jones et al disclose a chemical processing apparatus containing a plurality of treatment chambers having a dip chamber with filling pumps, a spray chamber which serves as a rinse chamber or a drying chamber (col. 2, lines 20-39 and 63-68; col. 3, lines 1-10). The rinse chamber would be filled with deionized water from a deionized reservoir (col. 2, lines 52-55). An essential part of the apparatus is a conveyor means for automatically transferring the workpieces from treatment chamber to treatment chamber. (Fig. 1; Col. 3, lines 50-55) The conveyor allows for a plurality of substrates to be processed substantially at the same time. Using a pump to move fluid from one chamber to another is conventional. Jones further teaches a "controlled heater 67" (column 2, lines 28-35) used in the "treatment" chamber that "may be used as a drying chamber" (column 3, lines 1-3).

As to claims 6 and 17, Jones et al disclose a cleaning/etching solution containing hydrofluoric acid (col. 5, lines 49-60; col. 6, lines 33-35 and 51-54). Jones et al disclose cone shaped bottom tanks (Figs. 6A-B).

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At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the multiple chambers for rinsing and drying of Jones et al with the etching apparatus of Nelson.

The motivation for doing so would have been to provide treating operations such as rinsing and drying of substrates as taught by Jones et al.

Nelson and Jones et al do not disclose expressly a temperature sensor or a concentration measuring.

As to claims 13-16, Tittle et al is discussed above.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to control the etching operation for the etching apparatus of Nelson and Jones et al with the chemical processing control system of Tittle et al.

The motivation for doing so would have been to monitor, initiate corrective action and establish limits as taught by Tittle et al (claim 8).

Therefore, it would have been obvious to a person of ordinary skill in the art to combine Nelson with Chung et al, Jones et al and Tittle to obtain the invention as specified in claims 3-6, 8-9 and 11-18.

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Response to Arguments

5. Applicant's arguments filed January 22, 2002 have been fully considered but they are not persuasive.

6. With regards to Applicant's position that "...the integrated pipe unit of Chung et al is not connected to a nitrogen supply line via an inlet pipe." (Page 5) does not fully characterize the Chung reference. Pipe 24 and supply port 27, both of Figure 4, would implicitly be fed nitrogen from a "supply line via an inlet pipe" as implied by Chung's statement - "...nitrogen is introduced into port 27...".

7. With regards to Applicant's position that "the combined stream 31 of Nelson does not connect the etcher and the rinse chamber; the combined stream 31 of Nelson connects the bulk storage tank to the etcher" (Page 5) is inaccurate. The sole Figure of Nelson clearly supports the prior observation as stated. Specifically, the rinse tank 4 feeds the ion exchange columns 27 and 11 through line 7 and valves 33 and 9. Further, the combined stream 31 is fed via the column effluents through valves 29 and 36.

8. With regards to Applicant's position that "Tittle fails to teach or suggest a control unit for receiving a signal indicating the temperature of the etchant from the temperature sensor and transmitting an etching termination signal to the etch bath when the temperature sensor reaches a target temperature...." (Page 6). The Examiner maintains his¹ position that Tittle both teaches and suggests a control unit (20; column 4, lines 64 - column 5, line 10) for receiving a signal

¹New Examiner as of January 23, 2002

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(“thermocouple...integrated circuit..providing an electrical response to changes in temperature” 11; column 3, lines 65-68) indicating the temperature of the etchant from the temperature sensor and transmitting an etching termination signal to the etch bath when the temperature sensor reaches a target temperature - “evaluates the parameters measured by the sensors ...to provide useful bath conditions”, here it is obvious to those of ordinary skill in the art that a “useful bath condition” would be the conditions existing for the termination of the “chemical process” (abstract).

9. With regards to Applicant’s position that “Nelson and Chung fail to teach or suggest at least the first tank, the etch bath, the separation tank, the rinse bath, the dry bath, the etchant supply source, the solvent supply source, and the control unit as recited in claim 11.”, the Examiner has made prior assertions as to which references teach what claimed components. Specifically, Nelson teaches a first tank (2, sole Figure), a rinse chamber (a second tank) (4, Fig. 1; col. 4, lines 49-68), and separation tanks (27,11). Chung teaches an etch bath (13, Fig. 2; col. 2, lines 35-38). Jones teaches a drying chamber (col. 2, lines 20-39 and 63-68; col. 3, lines 1-10). With regards to “sources” of an etchant and solvent, it is well appreciated by those of ordinary skill that such sources would necessarily exist as housing/containing such enchants and solvents. Tittle teaches a control unit (abstract; col. 3, lines 65-68; col. 4, line 64- col. 5, line 10).

10. With regards to Applicant’s position that “Tittle and Jones fail to teach or suggest at least etching of a glass substrate” - It is well established that apparatus claims must distinguish from the prior art in terms of what the apparatus is and not what the apparatus operates on. See MPEP 2115.

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Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.


GREGORY MILLS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700